

# CONSTRUCTION, SANITATION, AND HYGIENE

IN CHARGE OF  
M. E. P. DAVIS

## A DESCRIPTION OF THE PROPOSED NEW LAUNDRY OF THE UNIVERSITY OF PENNSYLVANIA HOSPITAL

WITH SPECIAL REMARKS AND EXPERIMENTS UPON DISINFECTION IN  
CONNECTION WITH THE WORK OF HOSPITAL LAUNDRIES\*

BY A. C. ABBOTT, M.D.

First Assistant in the Laboratory of Hygiene, University of Pennsylvania, now  
Professor of Hygiene, University of Pennsylvania

(*From the Laboratory of Hygiene, University of Pennsylvania*)

(Continued)

THE plan to which we give preference, because of its safety and simplicity, is as follows: All bedclothing and underclothing that are stained with evacuations from the intestinal canal, whether they are of an infectious nature or not, also all articles stained with discharges from wounds, are, upon their removal from the patient, to be placed at once in a covered vessel containing a disinfecting fluid that has been brought to the bedside, and they are to remain in this solution until the time necessary for disinfection has expired before they are permitted to be washed with other clothing.

Objections are occasionally raised to this method of procedure on the grounds that the action of chemical disinfectants is often that of a mordant for white goods stained by blood, fecal matters, and discharges from wounds generally, and for this reason the method has not met with general favor. As opposed to these objections, the advantages possessed by it are obvious,—viz., the clothing is not carried through the ward in a dry condition, but is placed, immediately upon its removal from the patient, in a covered vessel containing a reliable disinfectant, and after a very short time is harmless and can be handled without danger of spreading infection. In view of these advantages I have endeavored to determine experimentally how far the objections to this method are based upon fact.

In my experiments, which were made upon flannel, canton-flannel, and muslin, stained both by blood and by intestinal discharges, a num-

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ber of interesting and instructive results were obtained. The disinfectants with which I have made the experiments were moist heat in the form of hot water and steam, carbolic acid in three-per-cent. solution, a mixture of three-per-cent. carbolic acid and 1.5-per-cent. ordinary laundry soap in water, and 0.5-per-cent. solution of chloride of lime in cold water. Throughout, the strengths of the agents employed have been sufficient to insure disinfection of non-spore-bearing pathogenic organisms within one-half hour.

The results that I have obtained, stated in brief, are these,—viz.: white goods, including muslin, flannel, and cotton-flannel, when stained with blood or intestinal discharges, and the stains allowed to dry, and subjected to either hot water at a temperature of from 176° F. to the boiling-point, or when immersed for two hours in a solution of corrosive sublimate of the strength of 1 to 1000, have their stains so fixed that it is impossible to remove them subsequently by any of the ordinary methods employed in laundry work. Carbolic acid of the strength of three-per-cent. solution in cold water, alone or plus the addition of 1.5-per-cent. common laundry soap, which renders the acid more soluble, does not have the property of fixing these stains indelibly, even though the goods may be soaked in this solution for as long as eighteen hours.

Chloride of lime in the proportion of 0.5-per-cent. solution in cold water has also no effect in fixing the stains, and has likewise apparently no injurious action upon white fabrics that are exposed to it for a period of one hour. It is to be borne in mind that satisfactory results in disinfecting bedclothing and underclothing by this method, and at the same time ridding them of all unsightly stains, are only to be obtained when the entire process is carried on at a temperature not exceeding 100° F., for, as I have demonstrated, blood-stains and stains of intestinal evacuations, when partly removed from white goods by soaking them for from one to two hours in cold disinfectant solutions, may still be rendered partly indelible by the subsequent action of hot water.

They should, therefore, when the time necessary for disinfection has passed by, be removed from the disinfectant solution and thoroughly rinsed in cold soap and water until all traces of the stains have been removed; they can then be subjected to the usual processes of the laundry. I have found that blood-stains, both recent and old, are, contrary to what I had expected, more easily removed from white goods than are the stains of fecal matters; the latter, even when recent, but dried, are exceedingly difficult to remove. For the removal from white cotton goods of stains of this character, and at the same time for their complete disinfection, the solution of chloride of lime of the strength of 0.5-per-cent. acting for one hour has given me the best results, but

it is open to two objections—first, the difficulty of obtaining a preparation of this substance in which the proportion of available chlorine is at all constant, and, secondly, the objection frequently raised, for which I cannot vouch, that preparations of chlorine, when allowed to act repeatedly on cotton and woollen fabrics, cause them to deteriorate.

For these reasons I have given the preference to the mixture of carbolic acid and soap as recommended by Nocht (*Zeitschrift für Hygiene*, Bd. vii., 1889). The strength of the mixture is:

Carbolic acid, 3 parts;  
Common soft soap, 1½ to 2 parts;  
Cold water, 100 parts.

The soap is to be dissolved in the water, after which the acid is to be added and the mixture thoroughly stirred. Experiment has shown that in this strength all non-spore-forming pathogenic organisms are destroyed in one-half hour.

Another mixture that is sometimes recommended, and upon which I have made a few experiments, consists of equal parts of crude carbolic acid and concentrated sulphuric acid dissolved in water to the required strength; this is not to be recommended for laundry purposes, as it not only gives rise to an unsightly dirty-yellow discoloration of both cottons and woollens, but has also, in my experiments, had some effect in fixing the stains. This preparation of carbolic acid is, moreover, of very doubtful value in the proportion of phenol contained in it, is but a few cents per pound cheaper than commercial carbolic acid, and, as just stated, possesses disadvantages which at once exclude it from use in the laundry. There are three grades of carbolic acid usually on the market,—viz., the crude, the commercial, and the chemically pure. The first is excluded from use for the reasons just given, while the third mentioned is relatively too expensive; the second, the commercial carbolic acid in the strength given, answers perfectly well for all practical purposes.

(To be continued.)

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Do not indulge romantic ideas of superhuman excellence. Remember that the fairest creature is a fallen creature; yet let not your standards be low. If it be absurd to expect perfection, it is not unreasonable to expect *consistency*. Do not suffer yourself to be caught by a shining quality till you know it is not counteracted by the opposite defect. Be not taken in by strictness in one point till you are assured there is no laxity in others. In character, as in architecture, proportion is beauty.—**HANNAH MORE.**